Advanced Engineering

MMC Hitachi Tool

No. 426

Epoch21

CBN-EPSB/EPSR

Cubic Boron Nitride End Mill for high hardened materials

CBN

Cubic Boron Nitride

D 0.2 – 2

l_n ~10xD

Diameter checked

Labelled on box

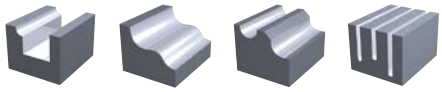
D µm

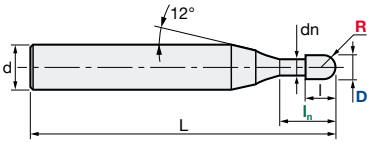
MMC Hitachi Tool Engineering Europe GmbH

www.high-speed-cutting.com

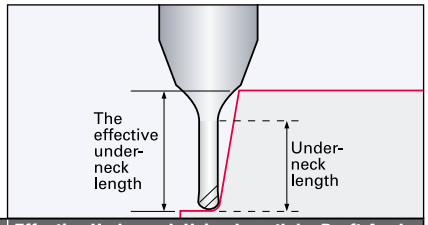
CBN-EPSB | Epoch CBN Ball End Mill

CBN	V max	Roughing	Semi-Finishing	Finishing	Super-Finishing	HRC	No. of Teeth	Rake Angle
Cubic Boron Nitride	High Speed	▽	▽▽	▽▽▽	▽▽▽▽	72	2	Negative





D	0 / -0.01 mm
R	± 0.005 mm
d	h4



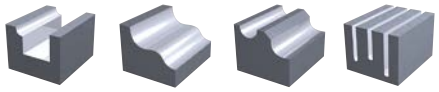
Size										Effective Underneck Using Length by Draft Angle				
ID Code	Item Code	Z	D	R	l_n	l	dn	L	d	0.5°	1°	1.5°	2°	3°
CB001	**CBN-EPSB-2002-0.5-F**	2	0.2	0.1	0.5	0.12	0.18	50	4	0.67	0.70	0.72	0.75	0.80
CB002	**CBN-EPSB-2002-1-F**				1					1.19	1.24	1.28	1.32	1.38
CB003	**CBN-EPSB-2003-0.75-F**		0.3	0.15	0.75	0.18	0.27			0.95	0.99	1.02	1.05	1.10
CB004	**CBN-EPSB-2003-1.5-F**				1.5					1.73	1.79	1.83	1.88	2.03
CB005	**CBN-EPSB-2004-1-F**		0.4	0.2	1	0.24	0.37			1.21	1.25	1.29	1.32	1.38
CB006	**CBN-EPSB-2004-2-F**				2					2.25	2.31	2.37	2.43	2.68
CB007	**CBN-EPSB-2005-1.5-F**		0.5	0.25	1.5	0.3	0.47			1.73	1.78	1.83	1.87	2.00
CB008	**CBN-EPSB-2005-3-Ⓢ**				3					3.28	3.36	3.46	3.62	3.99
CB009	**CBN-EPSB-2006-1.5-F**		0.6	0.3	1.5	0.36	0.57			1.73	1.78	1.82	1.86	1.98
CB010	**CBN-EPSB-2006-3-F**				3					3.28	3.36	3.46	3.61	3.97
CB011	**CBN-EPSB-2008-2.5-F**		0.8	0.4	2.5	0.48	0.77			2.76	2.83	2.89	2.99	3.28
CB012	**CBN-EPSB-2008-5-Ⓢ**				5					5.33	5.48	5.72	5.99	6.60
CB014	**CBN-EPSB-2010-2.5-F**		1	0.5	2.5	0.6	0.96			2.77	2.84	2.89	3.00	3.28
CB015	**CBN-EPSB-2010-5-F**				5					5.34	5.50	5.74	5.99	6.60
CB013	**CBN-EPSB-2010-10-Ⓢ**				10					10.50	10.95	11.44	11.98	13.23
CB017	**CBN-EPSB-2015-5-F**		1.5	0.75	5	0.9	1.44			5.36	5.53	5.75	6.00	6.58
CB016	**CBN-EPSB-2015-10-Ⓢ**				10					10.54	10.98	11.46	11.98	13.22
CB020	**CBN-EPSB-2020-5-F**		2	1	5	1.2	1.92			5.38	5.56	5.77	6.01	6.56
CB018	**CBN-EPSB-2020-10-F**				10					10.58	11.01	11.48	11.99	13.20
CB019	**CBN-EPSB-2020-20-Ⓢ**				20			55		21.00	21.90	22.88	23.96	x

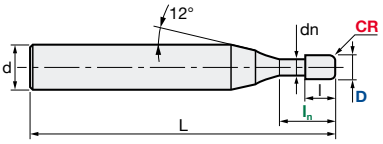
F	**Fine Type**	**≤ 5x D**
Ⓢ	**Strong Type**	**> 5x D**

x = no contact

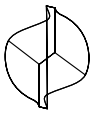
CBN-EPSR | Epoch CBN Radius End Mill

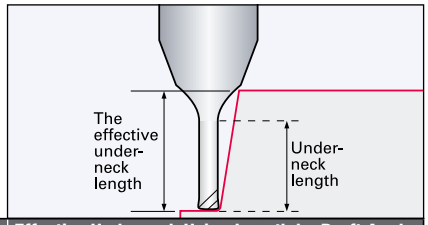
CBN	V max	Roughing	Semi-Finishing	Finishing	Super-Finishing	HRC	No. of Teeth	Rake Angle
Cubic Boron Nitride	High Speed	▽	▽▽	▽▽▽	▽▽▽▽	72	2	Negative





D	0 / -0.01 mm
CR	± 0.005 mm
d	h4



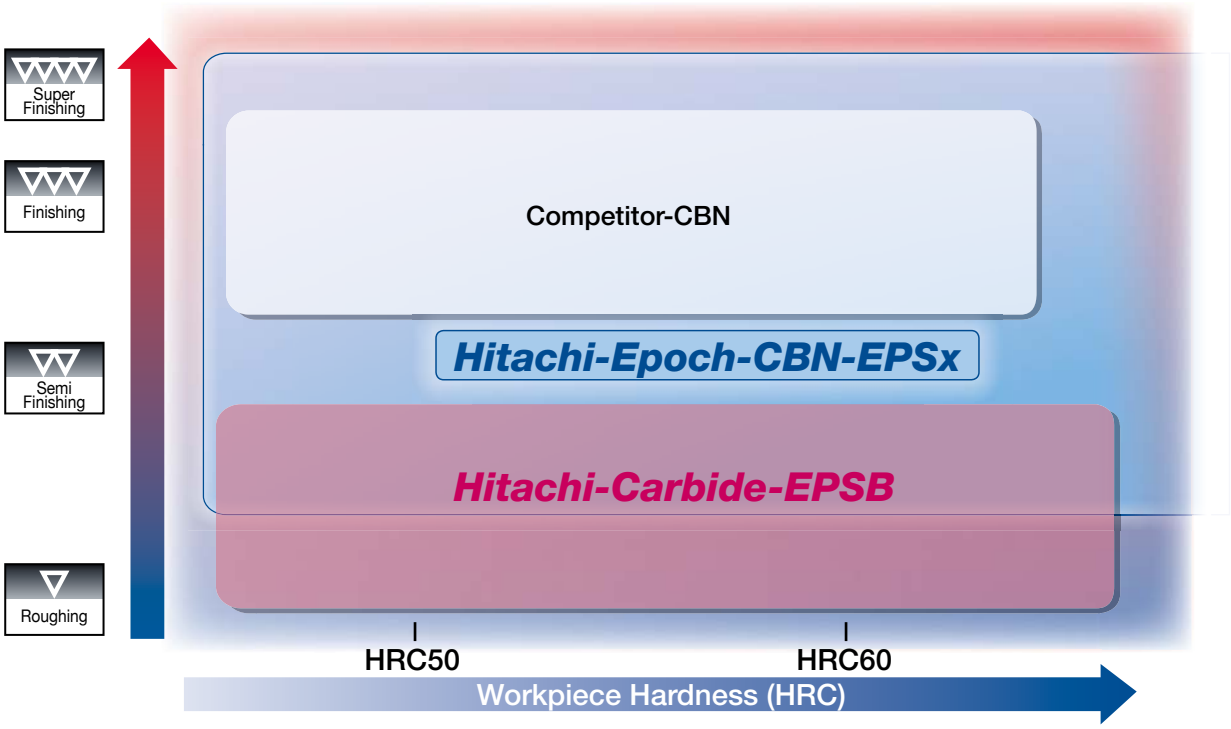


Size										Effective Underneck Using Length by Draft Angle				
ID Code	Item Code	Z	D	CR	l_n	l	dn	L	d	0.5°	1°	1.5°	2°	3°
CB021	**CBN-EPSR-2002-0.5-005**	2	0.2	0.05	0.5	0.07	0.18	50	4	0.67	0.70	0.73	0.76	0.81
CB022	**CBN-EPSR-2002-1-005**				1					1.19	1.24	1.28	1.32	1.39
CB023	**CBN-EPSR-2003-0.75-005**		0.3		0.75	0.11	0.27			0.96	0.99	1.03	1.06	1.12
CB024	**CBN-EPSR-2003-1.5-005**				1.5					1.74	1.79	1.84	1.89	2.06
CB025	**CBN-EPSR-2004-1-005**		0.4		1	0.14	0.37			1.22	1.26	1.30	1.34	1.40
CB026	**CBN-EPSR-2004-2-005**				2					2.25	2.32	2.38	2.46	2.73
CB027	**CBN-EPSR-2005-1.5-01**		0.5	0.1	1.5	0.18	0.47			1.74	1.79	1.84	1.88	2.05
CB028	**CBN-EPSR-2005-3-01**				3					3.28	3.37	3.48	3.65	4.04
CB029	**CBN-EPSR-2006-1.5-01**		0.6		1.5	0.21	0.57			1.74	1.79	1.84	1.88	2.05
CB030	**CBN-EPSR-2006-3-01**				3					3.28	3.37	3.48	3.65	4.04
CB031	**CBN-EPSR-2008-2.5-01**		0.8		2.5	0.28	0.77			2.77	2.84	2.91	3.05	3.37
CB032	**CBN-EPSR-2008-5-01**				5					5.34	5.51	5.76	6.04	6.69
CB034	**CBN-EPSR-2010-2.5-02**		1	0.2	2.5	0.35	0.96			2.78	2.85	2.93	3.06	3.37
CB035	**CBN-EPSR-2010-5-02**				5					5.35	5.53	5.78	6.05	6.69
CB033	**CBN-EPSR-2010-10-02**				10					10.51	10.97	11.48	12.03	13.33
CB037	**CBN-EPSR-2015-5-02**		1.5		5	0.53	1.44			5.38	5.58	5.83	6.11	6.75
CB036	**CBN-EPSR-2015-10-02**				10					10.56	11.03	11.53	12.09	13.39
CB040	**CBN-EPSR-2020-5-02**		2		5	0.7	1.92			5.40	5.63	5.88	6.16	6.82
CB038	**CBN-EPSR-2020-10-02**				10					10.61	11.08	11.59	12.15	13.45
CB039	**CBN-EPSR-2020-20-02**				20			55		21.04	21.97	22.99	24.11	x

x = no contact

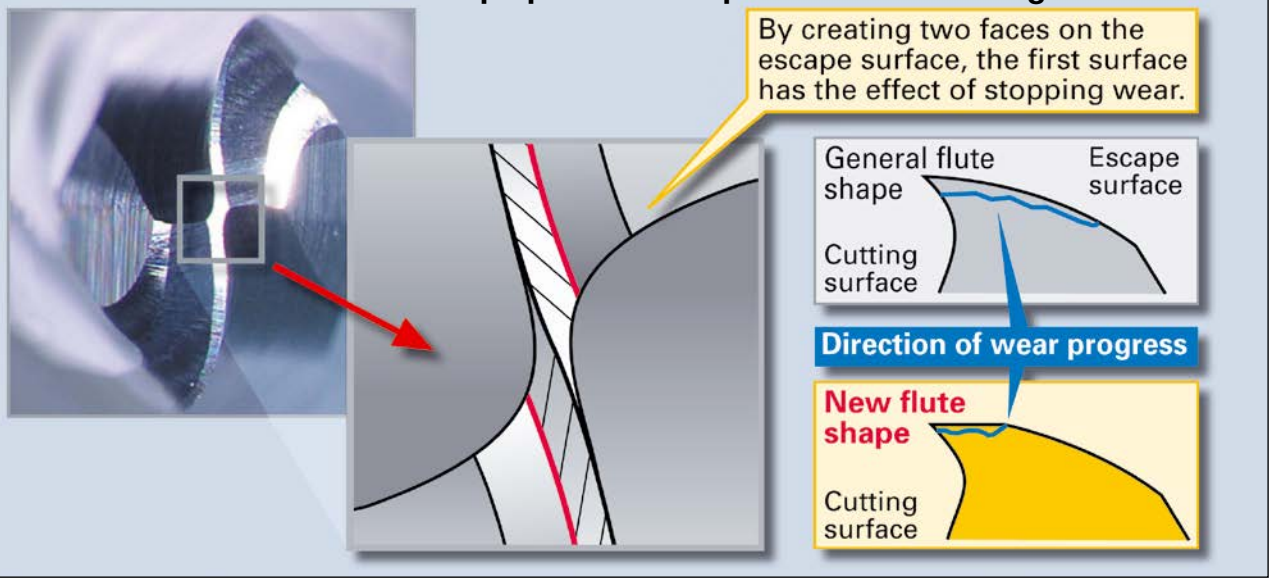
CBN-EPSB/EPSR | Epoch CBN Ball/Radius End Mill

Comparison of application fields



The Effect of CBN-EPSB Flute Shape:

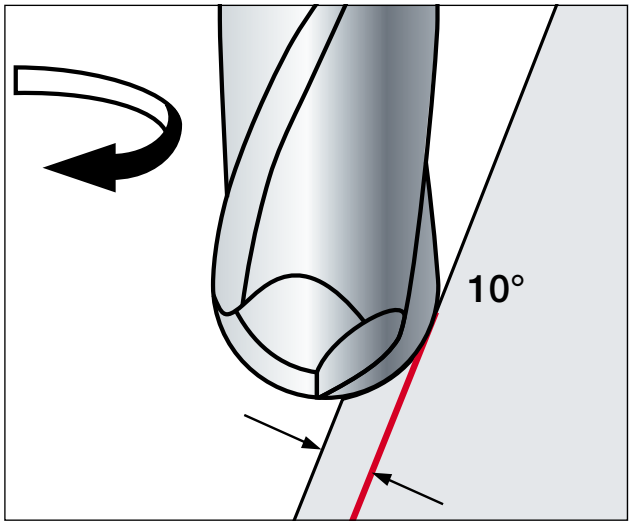
Double-Face Effect of new Shape prevents shape from deteriorating



CBN-EPSB/EPSR | Epoch CBN Ball/Radius End Mill

Comparison of finish cutting accuracy:

Company	Item	R
Hitachi Tool	Epoch-CBN	0.5
Competitor A	Competitor CBN	
Competitor B		
Competitor C		



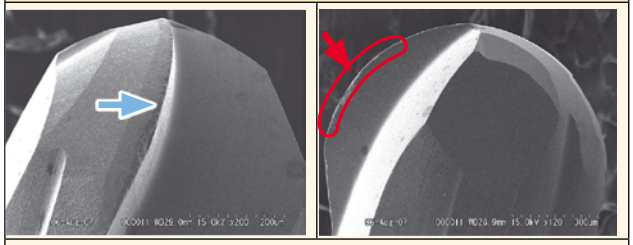
Machine: Sodick MC430L
W = 1.2379 (HRC62)

n = 40,000 min^{-1} **V_c** = 125 m/min
V_f = 2,400 mm/min **f_z** = 0.03 mm/tooth
Z = 0.05 mm Mist blow

Depth of Cutting: 0.05 mm

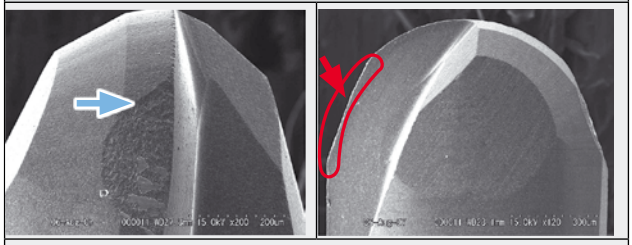
Comparison of tool wear state
Cutting length: 100 m, oil mist

Hitachi Tool CBN-EPSB



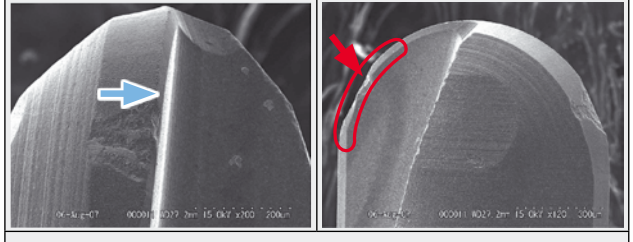
No flank wear

Competitor A



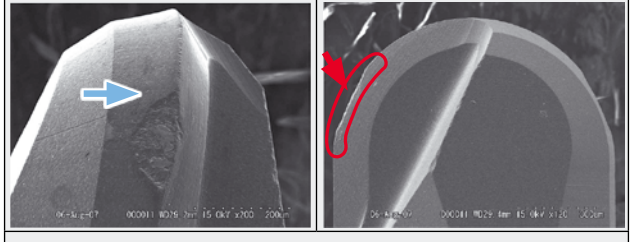
Large flank wear

Competitor B



Large flank wear

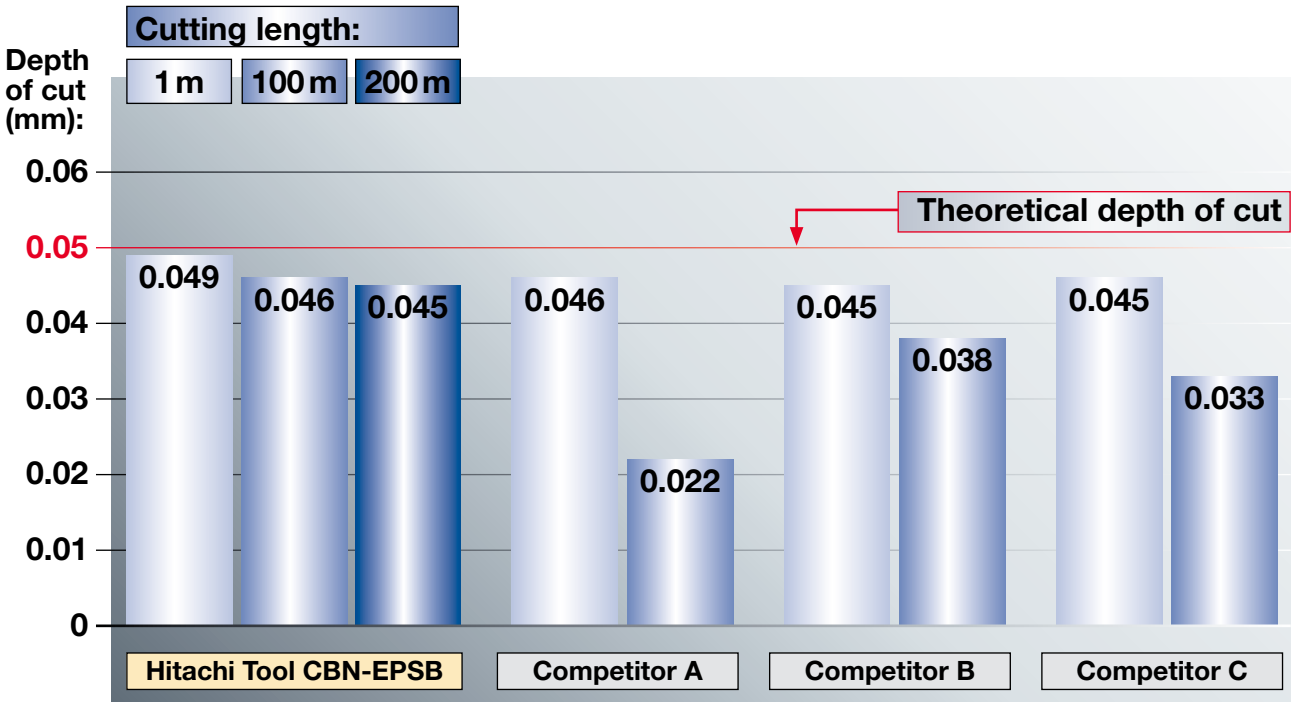
Competitor C



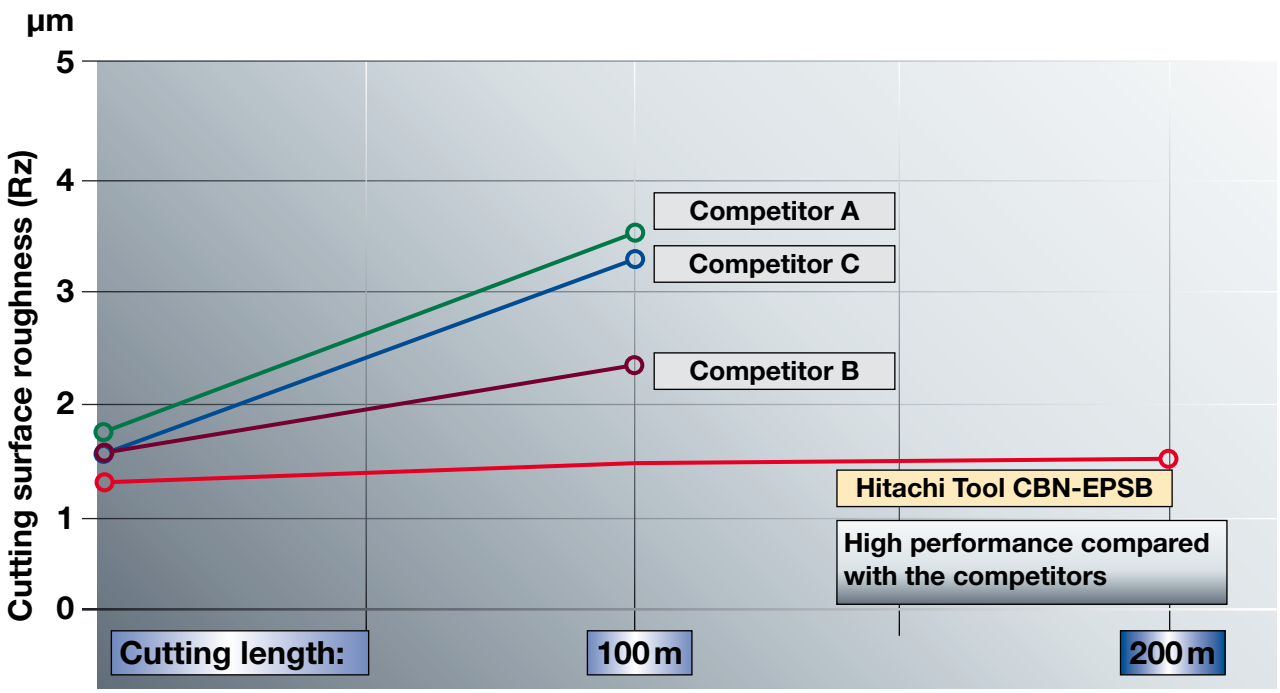
Large flank wear

CBN-EPSB/EPSR | Epoch CBN Ball/Radius End Mill

Comparison of cutting error



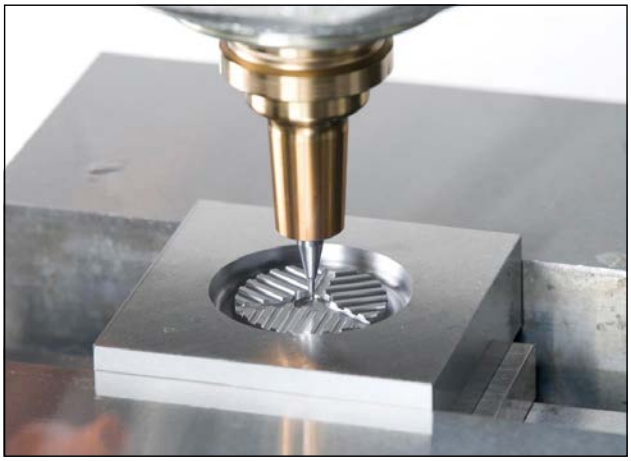
Comparison of finish surface roughness



CBN-EPSB/EPSR | Epoch CBN Ball/Radius End Mill

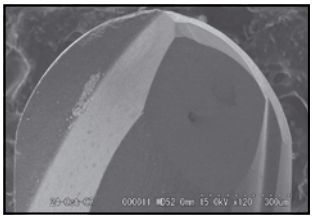
Direct milling: Comparison of performance from roughing to finishing

Material: 1.2379 (HRC62)

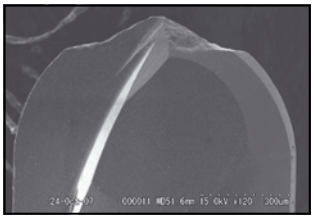


Roughing

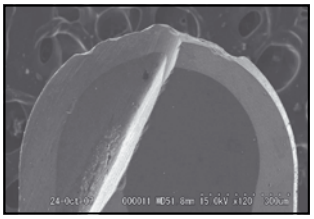
Tool = R 1 mm
n = 31,800 min^{-1}
V_c = 100 m/min
V_f = 3,180 mm/min
f_z = 0.05 mm/tooth
a_p = 0.05 mm
a_e = 0.15 mm
Dry (Air Blow)



Epoch-CBN
2 pockets



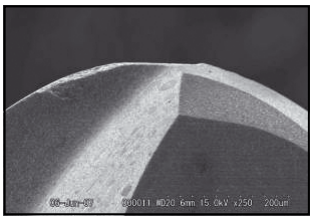
Competitor A
2 pockets



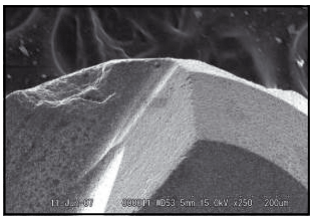
Competitor C
1 pocket

Finishing

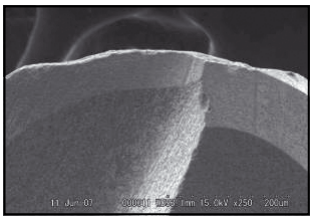
Tool = R 0.5 mm
n = 40,000 min^{-1}
V_c = 125 m/min
V_f = 2,000 mm/min
f_z = 0.025 mm/tooth
a_p = 0.03 mm
a_e = 0.09 mm
Dry (Air Blow)



Epoch-CBN
400 m flat milling



Competitor A
400 m flat milling



Competitor C
400 m flat milling

Advanced Engineering

MMC Hitachi Tool

Always up to date: Please check our P50 QuickFinder

PRODUCTION50® QuickFinder www.mmc-hitachitool-eu.com/quickfinder

Product Range

Solid Carbide End Mills

microEndMill · HD COATING · Epoch21 · CBN Cubic Boron Nitride · MINIATURE · 3D-Cut

Indexable Milling Tools

Indexable Milling

WHNSB Drills

WHNSB NON STEP BOREN

Milling Chucks

Milling Chucks

Distributed by:

MMC Hitachi Tool Engineering Europe GmbH

Itterpark 12 · 40724 Hilden · Germany · Phone +49 (0) 21 03–24 82-0 · Fax +49 (0) 21 03–24 82-30
E-Mail info@mmc-hitachitool-eu.com · Internet www.mmc-hitachitool-eu.com

HTT615 1503 CBN-6.5 BW-DS